WALDORF
PRODUCTION

Garrow
Decommissioning Programmes

Issued for Consultation
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APR_TORS_PMGT_012 Rev C1

Document Control

Approvals

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Terms and Abbreviations

Abbreviation	Explanation
AIS	Automatic Identification System
CA	Comparative Assessment
COP	Cessation of Production
DCR	Design and Construction Regulations
DESNZ	Department for Energy Security & Net Zero
DP	Decommissioning Programmes
EA	Environmental Appraisal
ESDV	Emergency Shut Down Valve
EUNIS	European Nature Information System
G1	Well 1 (42/25a-G1x)
G2	Well 2 (42/25a-G2y)
HSE	Health and Safety Executive
ICES	International Council for the Exploration of the Seas
JNCC	Joint Nature Conservation Committee
JUWB	Jack-Up Work Barge
KM	Kilometre
LSA	Low Specific Activity
LV	Lift Vessel
M	Metres
M^2	Meters Squared
M^3	Meters Cubed
MAT	Master Application Template
MCV	Monohull Crane Vessel
MEG	Monoethylene Glycol
N/A	Not Applicable
NFFO	National Federation of Fishermen's Organisations
NIFPO	Northern Ireland Fish Producers Organisation
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority
NUI	Normally Unattended Installation
OEUK	Offshore Energies United Kingdom
OPRED	Offshore Petroleum Regulator for Environment & Decommissioning

OSPAR	Oslo and Paris Convention
P & A	Plug and Abandonment
PL	Pipeline
PON	Petroleum Operations Notice
PUK	Perenco (UK) Limited
PWA	Pipeline Works Authorisation
SAC	Special Area of Conservation
SAT	Subsidiary Application Template
SCAP	Supply Chain Action Plan
SLV	Sheer Leg Vessels
SNS	Southern North Sea
SSCV	Semi-Submersible Crane Vessel
Te	Tonne
THC	Total Hydrocarbon Content
Trent	43/24 Installation
UKCS	UK Continental Shelf
UTM	Universal Transverse Mercator
WGS84	World Geodetic System 1984
WPRL	Waldorf Petroleum Resources Limited
"	Inch, 25.4millimetres

Appendices

1. EXECUTIVE SUMMARY

1.1 Combined Decommissioning Programmes

This document contains two decommissioning programmes for each set of associated notices served under section 29 of the Petroleum Act 1998.

The decommissioning programmes are for:

- Garrow field, small steel platform
- Two Garrow pipelines, PL2160 & PL2161

1.2 Requirement for Decommissioning Programmes

Installation:

In accordance with the Petroleum Act 1998, the Section 29 notice holders of the Garrow installation (see Table 1.2) are applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the installation detailed in Section 2.1 and 2.2 of this programme. (See also Section 8 - S29 holder letters of support).

Following public, stakeholder and regulatory consultation, this decommissioning programme is submitted without derogation and in full compliance with Department for Energy Security & Net Zero (DESNZ) guidelines.

Pipelines:

In accordance with the Petroleum Act 1998, the Section 29 notice holders of the Garrow pipelines (see Table 1.4) are applying to the OPRED to obtain approval for decommissioning the pipelines detailed in Section 2.3 of this programme. (See also Section 8 – S29 holder letters of support).

In accordance with Regulation 14 of the Pipeline Safety Regulations 1996, notification to the Health and Safety Executive (HSE) of the decommissioning of the pipelines and submission of the required variations to the Pipeline Works Authorisation to carry out the pipelines cleaning and disconnection activities will be made.

1.3 Introduction

The Garrow field is in the Southern Basin of the UKCS, across blocks 42/25a and 43/21a and was previously covered by licence P1034 which was relinquished on the 4th of February 2022.

The Kilmar Field Operator is Waldorf Petroleum Resources Limited (WPRL). The appointed Installation and Pipelines Operator is ODE Asset Management. The appointed Wells Operator is Exceed Torridon Limited.

The field was first discovered in 1991 and two production wells were drilled, 42/25a-G1x (G1) in 2007 and 42/25a-G2y (G2) in 2009. Prior to drilling a small steel platform, fixed steel jacket and single topside, designated as a Normally Unattended Installation (NUI), was installed in 2006 and an 8" gas export pipeline (PL2160) and piggybacked 3" service pipeline (PL2161) was laid 22.4km to the WPRL Kilmar platform. These pipelines also run through block 43/22.

The Garrow platform is located 72km offshore to the northeast of the nearest landfall at Flamborough Head off the UK coastline, 88km northeast of the Dimlington Gas Terminal, and

160km north northeast of the BGT. The platform, a small steel platform, has a topside weighing 415 tonnes and a jacket weighing 1030 tonnes which is in 52.6m of water. The platform and pipelines are located within the Southern North Sea SAC which is an area of importance for harbour porpoise (see Fig. 1.4).

Production first commenced from G1 in February 2007, the addition of G2 in 2009, with the gas exported to the Bacton Gas Terminal (BGT), via the WPRL Kilmar and Perenco UK Limited (PUK) Trent platforms, and the Esmond Transmission System (ETS) pipeline.

Production has since declined and PUK have closed the Garrow and Kilmar export route at Trent. Subsequently both Garrow and Trent were placed in Hydrocarbon Safe (HCS) status whilst applying for Cessation of Production (CoP) to the NSTA. Garrow CoP date is 2nd June 2020.

Following public, stakeholder and regulatory consultation, the decommissioning programmes are submitted without derogation and in full compliance with DESNZ guidelines. The decommissioning programmes explain the principles of the removal activities and is supported by an Environmental Appraisal (EA) and Comparative Assessment (CA).

1.4 Overview of Installations and Pipelines Being Decommissioned

1.4.1 Installation

Table 1.1: Installation Being Decommissioned			
Field	Garrow	**Production Type (Oil/Gas/Condensate)**	Gas
Water Depth (m)	52.6	**UKCS blocks**	42/25a and 43/21a
Distance to median (km)	115	**Distance from nearest UK coastline (km)**	72
Surface Installation			
Number	Type	Topside Weight (Te)	Jacket Weight (Te)
1	Fixed steel jacket	415	1,030
Platform Wells		**Well Designations**	
2		42/25a-G1x and 42/25a-G2y	

Table 1.2: Installation Section 29 Notice Holders Details		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
Waldorf Petroleum Resources Limited	03949599	17%
Energean UK Ltd	06683599	68%
RockRose (UKCS3) Limited	04620801	15%
Waldorf Energy Partners Limited	11957078	0%
Alpha Petroleum (UK) Holdings Limited	08774092	0%
Energean PLC	10758801	0%
Sojitz Corporation	JP000031469JPN	0%
Viaro Energy Limited	12471979	0%

1.4.2 Pipelines

Table 1.3: Pipelines Being Decommissioned	
Number of Pipelines (Details given in Table 2.2)	2

Table 1.4: Pipelines Section 29 Notice Holders Details		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)**
Waldorf Petroleum Resources Limited	03949599	17%
Energean UK Ltd	06683599	68%
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Viaro Energy Limited	12471979	0%

1.5 Summary of Proposed Decommissioning Programmes

Table 1.5: Summary of Decommissioning Programmes	
Proposed Decommissioning Solution	**Reason for Selection**
1. Topside	
Complete removal and re-use or recycle. The topside will be made hydrocarbon free, removed by a lift vessel and returned to shore. Re-use followed by recycle and then landfill will be the prioritised options for the topside.	Complies with OSPAR requirements and DESNZ guidelines and maximises recycling of materials.
2. Substructures – Jacket	
Complete removal and re-use or recycle. Jacket will be removed and dismantled at an onshore location. Re-use followed by recycle will be the prioritised options. Jacket skirt piles will be severed at least 3.0m below the seabed. If any practical difficulties are encountered WPRL will consult OPRED.	Leaves a clear seabed, removes a potential obstruction to fishing operations and maximises recycling of materials, to comply with OSPAR requirements and DESNZ guidance.
3. Pipelines (buried sections)	
Pipelines flushed and cleaned and left buried in situ. Cleaning methodology not yet defined but it is likely the 3" service pipeline will be flushed through with seawater into the 8" export pipeline. The 8" pipeline will then be flushed with seawater at velocity with two pipeline volumes and the contents disposed of down a Garrow well.	Pipelines are fully buried 0.6m below the natural seabed level. The Comparative Assessment concludes minimal seabed disturbance, lower energy usage and reduced risk to personnel is the practicable solution compared to complete removal. No pipeline exposures have been seen in the operational life of the pipelines which have remained buried. Some seabed movement has been seen but not sufficient to expose buried pipelines.

4. Pipeline spools / pipeline platform approaches and stabilisation features	
Surface laid tie-in spools/pipeline sections at the platform approaches and their pipeline stabilisation features (mattresses and grout bags) removed, returned to shore, and recycled. If any practical difficulties are encountered WPRL will consult OPRED. Pipeline sections and pipeline stabilisation features (mattresses and grout bags) under rock dump to remain in situ. A single Mattress at each cut end may also remain to prevent a snagging hazard if the cut end is exposed and not easily covered by the existing rock dump. The mattresses will be moved, the pipelines cut, and any remaining mat will be level with seabed and overtrawlable.	To leave, as far as reasonably practicable, a clear seabed to comply with OSPAR requirements and DESNZ guidance. CA has concluded that rock dumped trench transition sections should remain in situ. Current condition does not prevent others from using the seabed and is not a hazard. Recovery of rock is impracticable and redistribution to allow underlying pipeline recovery may create snagging hazards over a wider seabed area.
5. Wells	
P&A in accordance with HSE 'Offshore Installations and Wells Design and Construction Regulations 1996', 'Offshore Energies UK Guidelines and licence conditions for the Suspension and Abandonment of wells Issue 7, November 2022', and compliant with the relevant WONS applications. Any problems encountered the relevant authority will be consulted. Conductors will be cut a minimum of 3m below the natural seabed level. If any practical difficulties are encountered WPRL will consult OPRED.	Meets HSE regulatory requirements and is in accordance with OEUK and NSTA guidelines and licence conditions.
6. Interdependencies	
The Garrow risers at the Kilmar platform and the Garrow pipeline tie-in spools and associated mattresses within the Kilmar 500m safety zone will be decommissioned as part of the future WPRL Kilmar decommissioning programmes. The Kilmar facilities have the same Section 29 Notice Holders as Garrow. There are no third party pipeline or cable crossings.	

1.6 Field Location Including Field Layout and Adjacent Facilities

Figure 1.1 Field Location in UKCS Quadrant 42

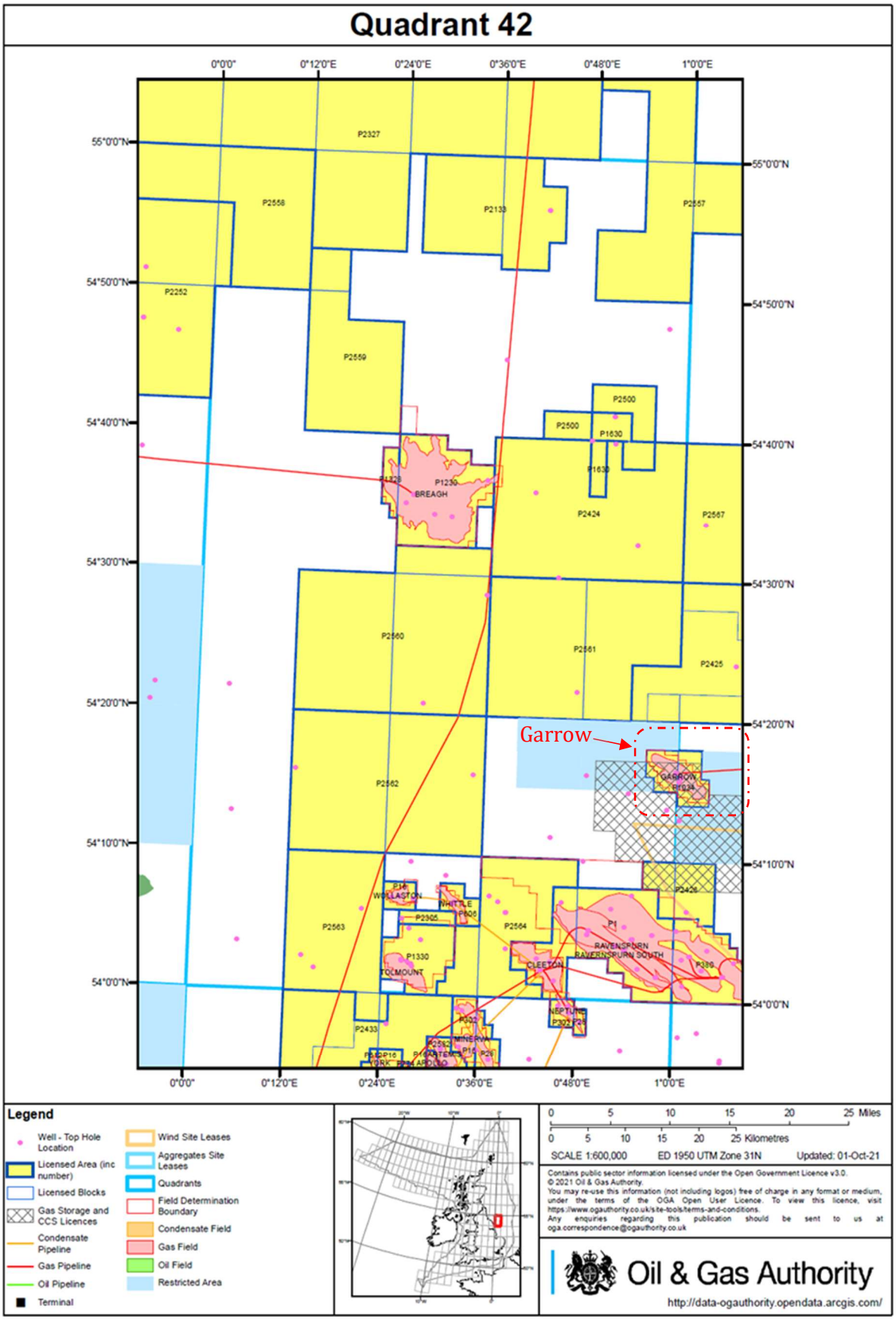


Figure 1.2 Field Location in UKCS Quadrant 43

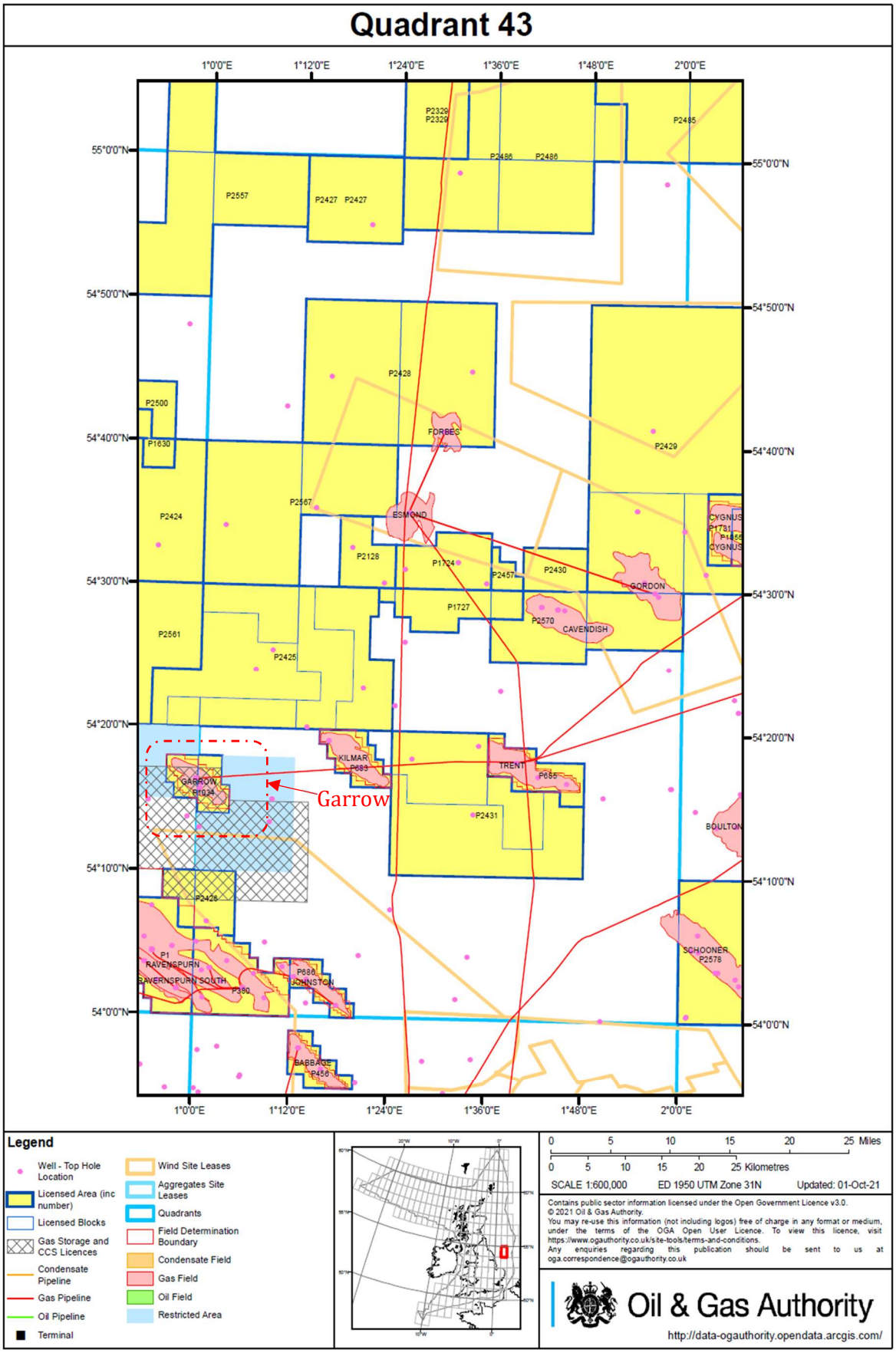


Figure 1.3 Schematic Field Layout Map

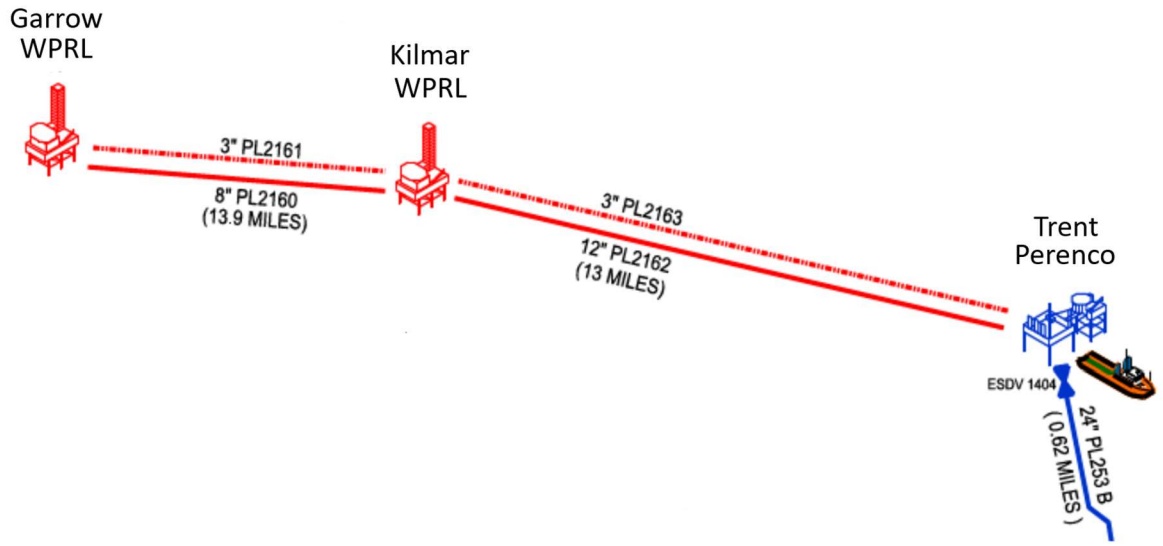


Figure 1.4 Marine Protected Areas surrounding Garrow

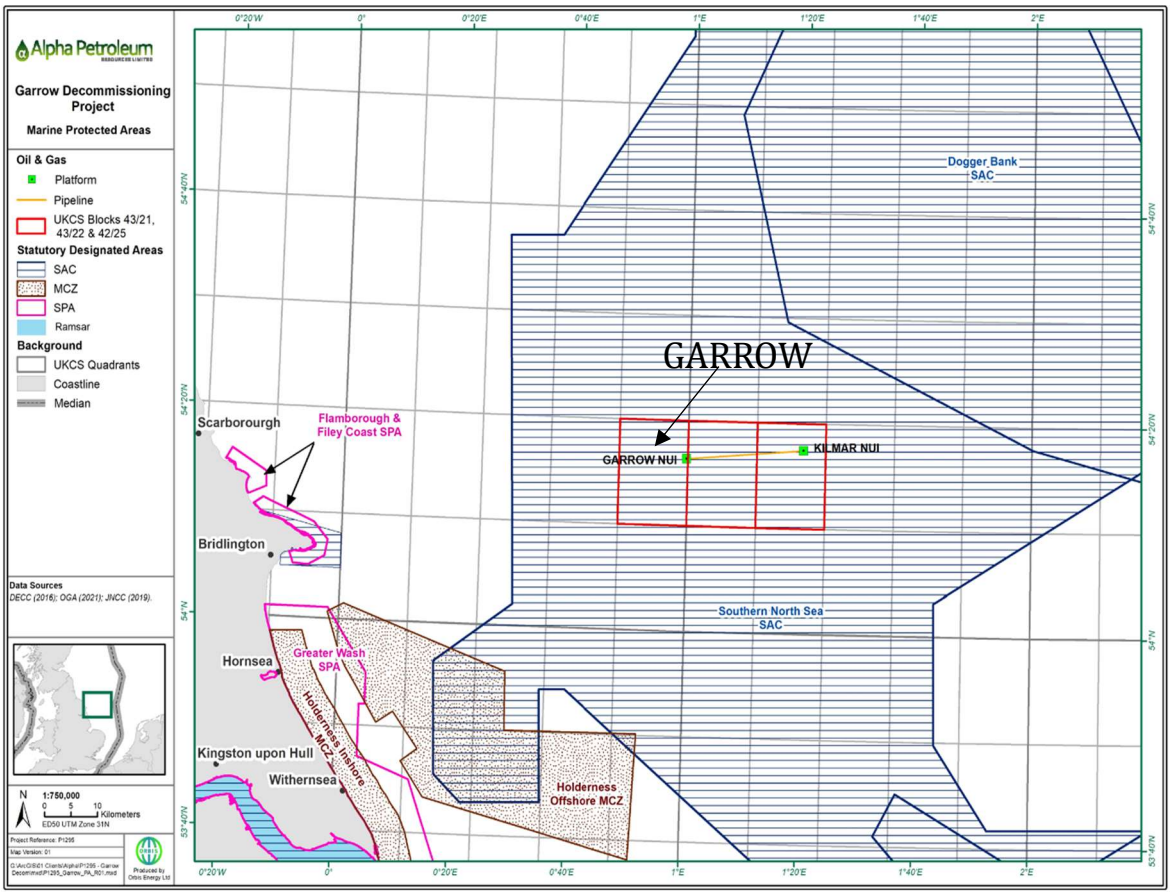


Figure 1.5 Field Location and Adjacent Facilities

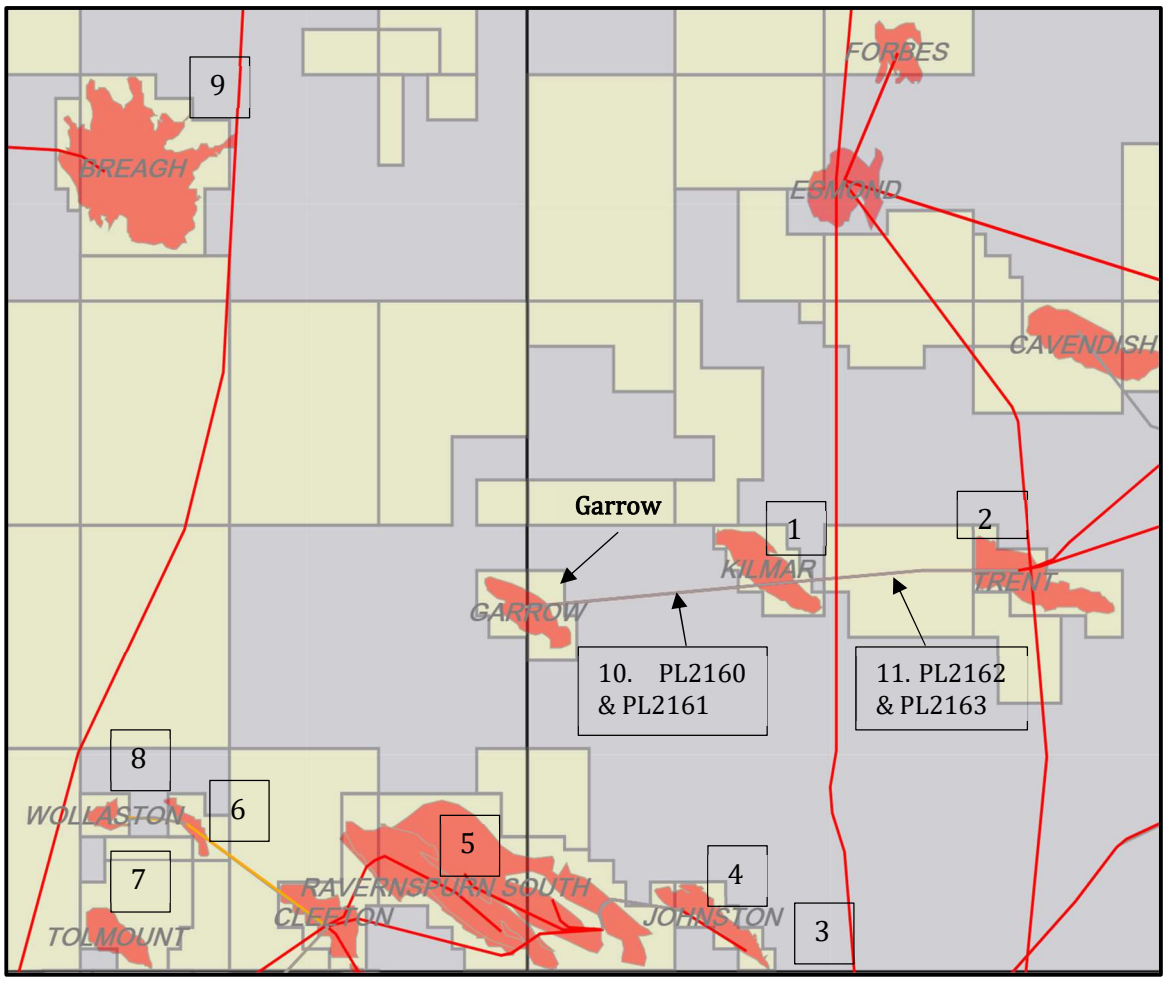


Fig 1.6 Garrow Export route to shore

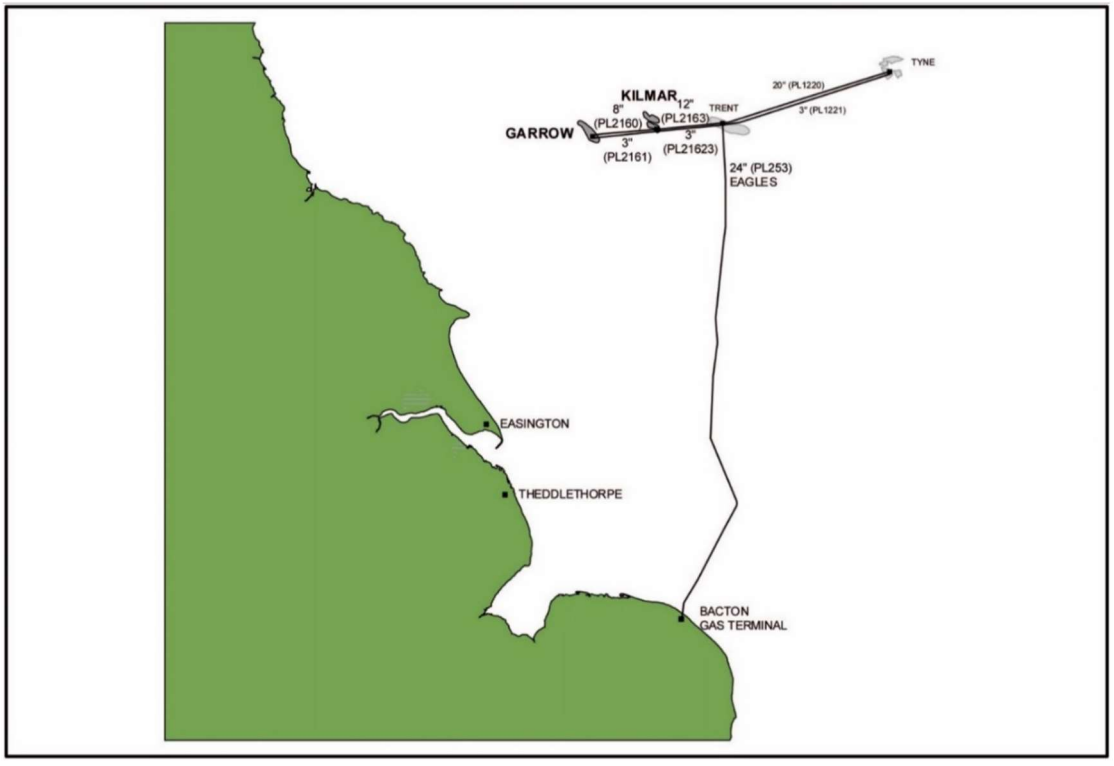


Table 1.6: Adjacent Facilities						
Ref	**Operator**	**Name**	**Type**	**Distance/ Direction**	**Information**	**Status**
1	Waldorf Petroleum Resources Limited	Kilmar	Platform	22km East, 85°	WPRL Installation	Operational and shut-in
2	Perenco (UK) Limited	Trent	Platforms	44km East, 85°	Third party installation	Operational and shut-in
3	NEO Energy	Babbage	Platform	40km South,170°	Third party installation	Operational
4	Premier Oil E&P UK EU Limited	Johnston	Subsea wells	29km South Southeast, 151°	Third party installation	Operational
5	Perenco (UK) Limited	Ravenspurn	Platforms	23km – 34km South Southwest, 193°	Third party installation	Operational
6	Perenco (UK) Limited	Whittle	Subsea well	34km Southwest, 230°	Third party installation	Operational
7	Harbour Energy	Tolmount	Platform	51km Southwest,230°	Third party installation	Operational
8	Perenco (UK) Limited	Wollaston	Subsea well	41km Southwest, 245°	Third party subsea installation	Operational
9	Ineos Oil &Gas UK	Breagh	Platform	51km Northwest, 345°	Third party installation	Operational
10	Waldorf Petroleum Resources Limited	Garrow Pipelines, PL2160 / PL2161	Pipelines	Between Garrow and Kilmar	PL2160: 22km 8” gas export pipeline PL2161: 22km 3” service pipeline	Non-operational
11	Waldorf Petroleum Resources Limited	Kilmar Pipelines, PL2162 / PL2163	Pipelines	Between Kilmar and Trent	PL2162: 21km 12” gas export pipeline PL2163: 21km 3” service pipeline	Non-operational
Impacts of Decommissioning Proposals						
The Kilmar installation, with the same Section 29 Notice Holders as Garrow, is the only installation affected by Garrow decommissioning. The Garrow riser on the Kilmar platform will be decommissioned as part of the future Kilmar platform decommissioning in accordance with the Section 29 notification.						

1.7 Industrial Implications

It is the intention to develop a contract and procurement strategy that will result in a safe, efficient, and cost-effective execution of the decommissioning works. Where appropriate, existing framework agreements will be used for decommissioning scope. WPRL will aim to reduce costs by combining scope with other Operators should the opportunity arise.

WPRL has submitted the Supply Chain Action Plan (SCAP) to NSTA which outlines the Garrow decommissioning project activities in relation to its supply chain. This is to derive maximum

value, reduce expenditure and demonstrate WPRL and its partners Energean and RockRose are well positioned to deliver their Decommissioning Programme commitments. The SCAP outlines how WPRL intends to contribute towards Total Value Added through fair and open engagement with its chosen supply chains, through a robust 'Invitation To Tender' (ITT), assessment process and evaluation process.

WPRL have identified the intention to complete the work using vessel(s) within the Decommissioning Programmes. The vessel(s) will be identified at a later date.

2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Installation: Surface Facilities

Table 2.1: Surface Facilities Information								
Name	Facility Type	Location WGS84 Decimal Minute	Topside		Jacket			
			Weight (Te)	No. of modules	Weight (Te)	No. of legs	No. of piles	Weight of piles (Te)
Garrow Installation	Small steel platform	54° 16' 23.7244"N 00° 59' 46.6892"E	415	1	1030	4	4	520

2.2 Pipelines Including Stabilisation Features

Gas was exported from Garrow to Kilmar via PL2160. Monoethylene Glycol (MEG) for hydrate and corrosion inhibition was supplied from Kilmar the via PL2161 pipeline. PL2161 was installed simultaneously to the larger PL2160 pipeline into the same protection trench for the majority of the route. The two only separate at the final approaches to the Garrow and Kilmar platforms but both are protected by the same concrete mattresses.

Based upon the original as backfilled surveys and operational life interim general inspection surveys it can be concluded that the full length of pipelines are currently buried to a depth well in excess of 0.6m and normally between 1.5m and 1.8m deep with the exception of the Pipeline approaches at the platform ends. Full details of the pipelines protection can be found in the 'Garrow pipelines (PL2160 and PL2161) Decommissioning Options Comparative Assessment APR_TORS _PMGT_013 document.

Table 2.2: Pipeline Information					
Pipeline Number	Description	Diameter and PWA Consented Length	Material	Burial Status	Pipeline Status
PL2160	Gas export pipeline conveying unprocessed natural gas from Garrow Platform ESDV to Kilmar Platform ESDV	8" diameter, 22.410km long	API 5L X65 steel pipe with 3-Layer Polypropylene	Trenched and buried 1.5m – 1.8m below the seabed up to the tie-in spools*	non-operational
PL2161	Service pipeline conveying MEG and corrosion inhibitor from Kilmar Platform ESDV to Garrow Platform ESDV	3" diameter, 22.410km long	API 5L X65 steel pipe with 3-Layer Polypropylene	Trenched and buried 1.5m – 1.8m below the seabed up to the tie-in spools*	non-operational

* 98.2% of the pipelines are buried up to the tie-in spools / trench transition at the Garrow and Kilmar platforms. The tie-in spools and pipeline platform approach sections are surface laid and account for 1% (225m) of the pipeline length. 0.8% is the riser and topsides PWA consented sections.

Of the surface laid sections ~69% (155m) is mattress protected and ~31% is rock dump protected. In total <1% of the route is rock protected either within or outside the trenched sections.

Table 2.3: Pipeline Stabilisation Features				
Stabilisation Feature	Total Number	Weight (Te)	Location(s)	Exposed/Buried/ Condition
Concrete mattresses	24	Various: ≈6.2 Te each	Along PL2160 and PL2161. 12 within the Garrow 500m safety zone. 12 within the Kilmar 500m safety zone.	Exposed with 2 partially rock dumped at the trench transitions
Grout bags	≈150	25kg each	Various around the concrete mattresses	Buried and exposed around the concrete mattresses
Rock Dump (Garrow)	1 location	≈750 Te	1 location. 80m of rock stabilisation through trench transition zone. Rock berms typically 8m wide	Exposed
Rock Dump (Kilmar)	1 location	≈750 Te	1 location. 80m of rock stabilisation through trench transition zone. Rock berms typically 8m wide	Exposed

2.3 Wells Information

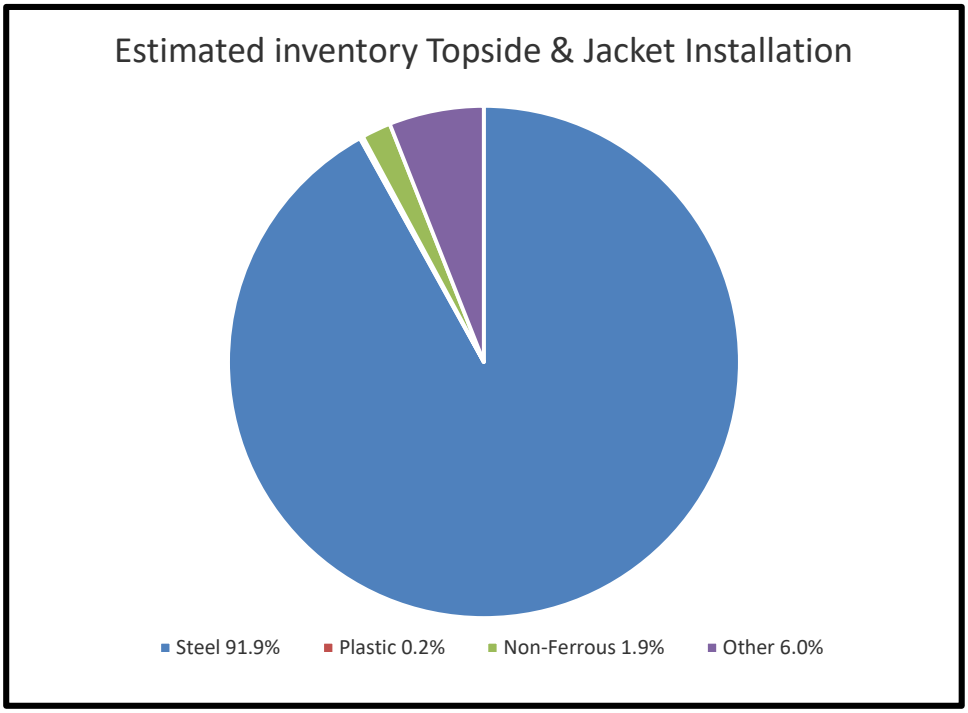
Table 2.4: Well Information			
Platform Wells	Designation	Status	Category of Well
42/25a-G1x	Gas Production	Shut-in	PL 3-3-3
42/25a-G2y	Gas Production	Shut-in	PL 3-3-3

2.4 Drill Cuttings

There is no evidence of drill cuttings associated with the Garrow installation. Drill cuttings that were generated during the prior drilling activity would have been distributed widely during drilling due to the local currents. WPRL has carried out seabed sampling to verify the absence of any cutting debris.

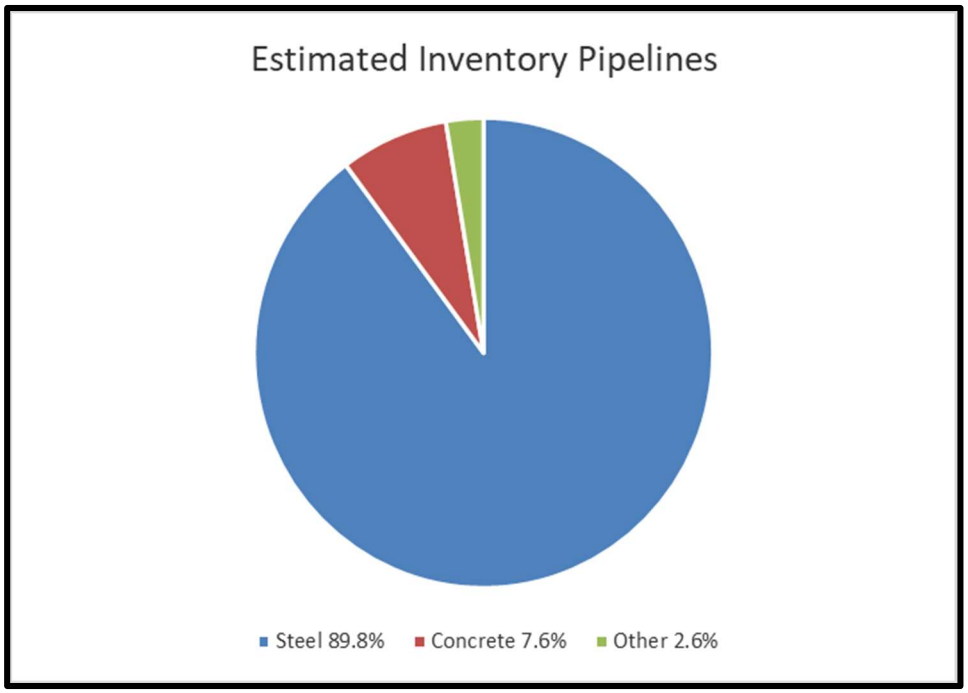
2.5 Inventory Estimates

Figure 2.1: Pie Chart of Estimated Inventories (Installation)



Total Topside & Jacket weight 1,445 Te

Figure 2.2: Pie Chart of Estimated Inventory (Pipelines)



Total Pipelines weight 2,004 Te.

Note: Includes the weights of tie-in spools, anodes, mattresses and grout bags, but excludes rock cover.

Note: Refer to the EA, Section 7, for further information on inventories remaining and their environmental impact.

3. REMOVAL AND DISPOSAL METHODS

Waste will be dealt with in accordance with the Waste Framework Directive 2008/98/EC. The reuse of an installation or pipelines (or parts thereof) is first in the order of preferred decommissioning options, followed by recycling, recover other value and landfill if no alternative is available. Waste generated during decommissioning will be segregated by type and transported to shore in an auditable manner to a disposal yard/dismantling site and recycled through licensed waste contractors in accordance with regulations. Waste disposed of outside of the United Kingdom will be in accordance with the Transfrontier Shipment of Waste Regulations 2007. Steel and other recyclable metal are estimated to account for the greatest proportion of the materials inventory. A decision has yet to be made about disposal routes, if taken out with the UK, Transfrontier Shipment of Waste Regulations will be adhered to. Reference EA, section 3.5, for further information on waste.

Re-use / alternative uses for the Garrow facilities were examined including using the pipeline as part of another project infrastructure, the use of one of the wells for CCSU monitoring, use of the platform as a bird sanctuary and relocation of the jacket and/or topside facilities, however, none of these were deemed viable.

The platform equipment inventory will be assessed for use as spares for WPRL asset portfolio.

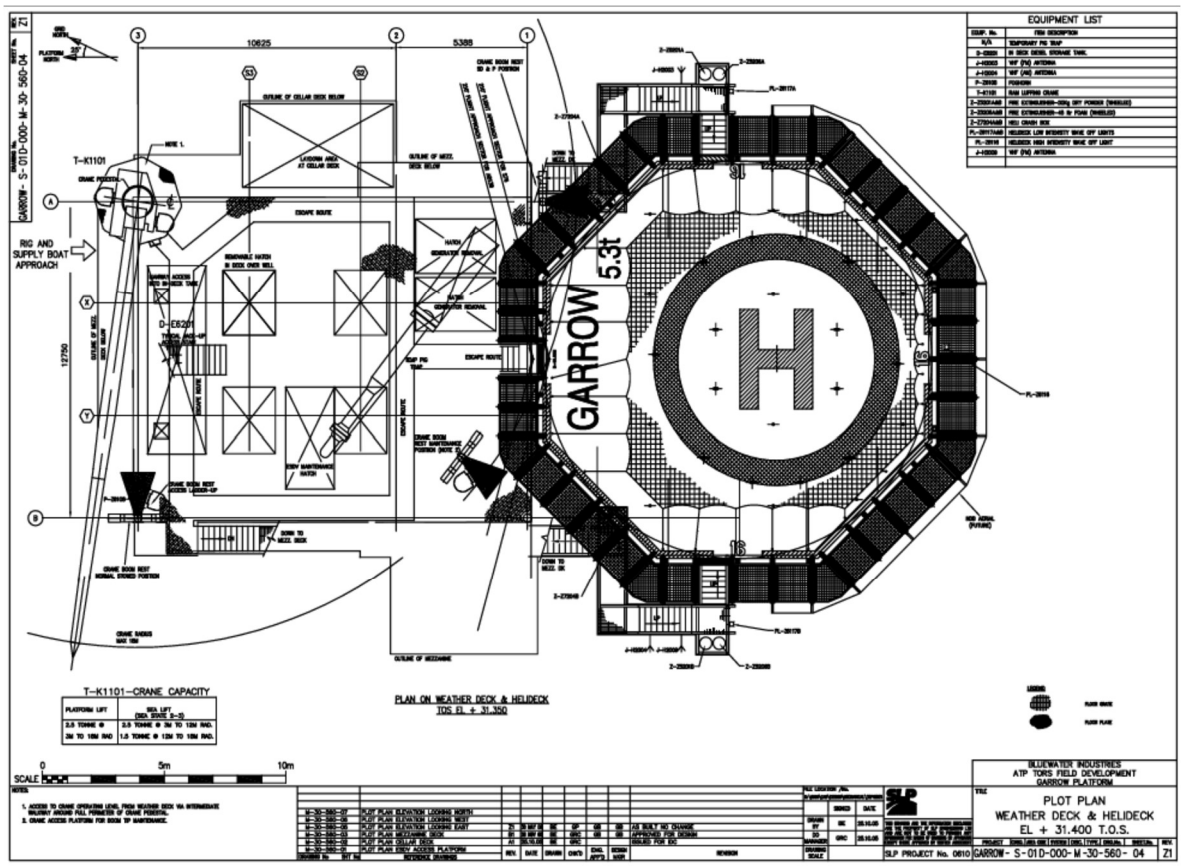
3.1 Topside

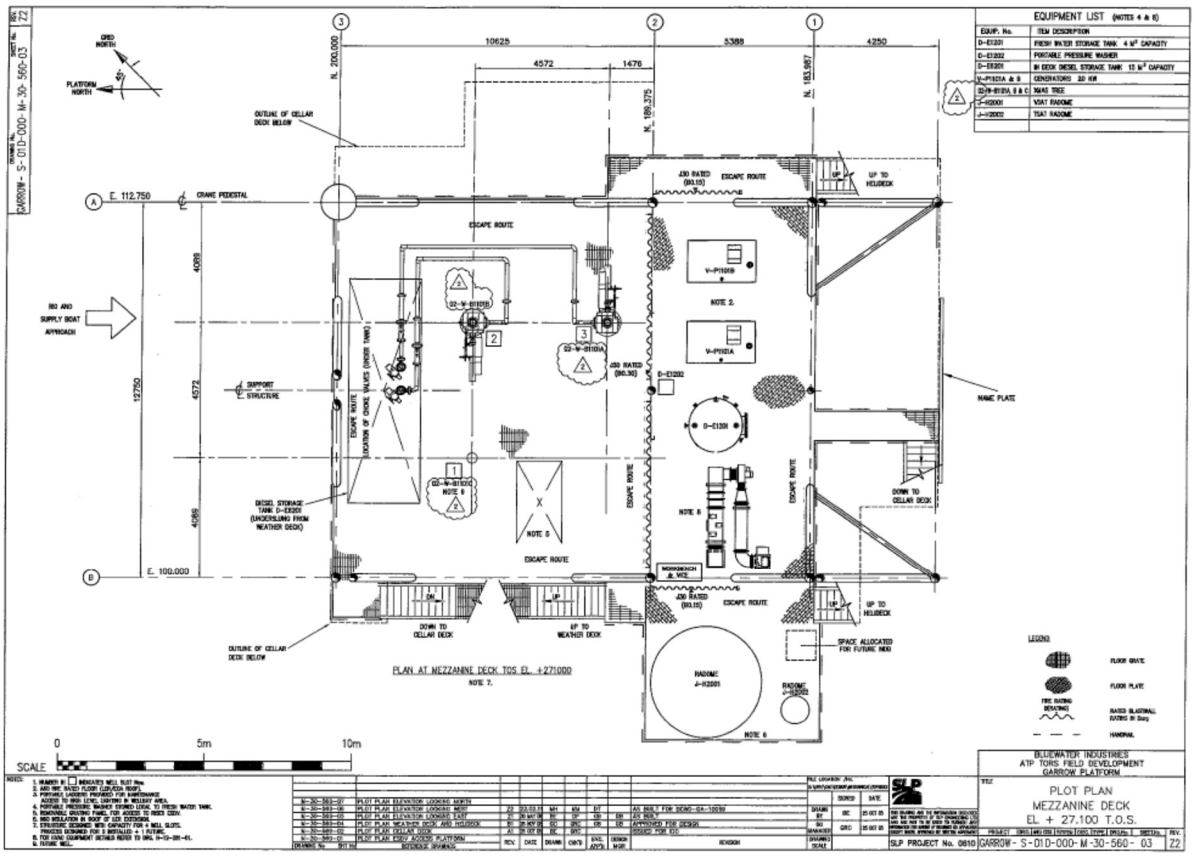
3.1.1 Topside Decommissioning Overview

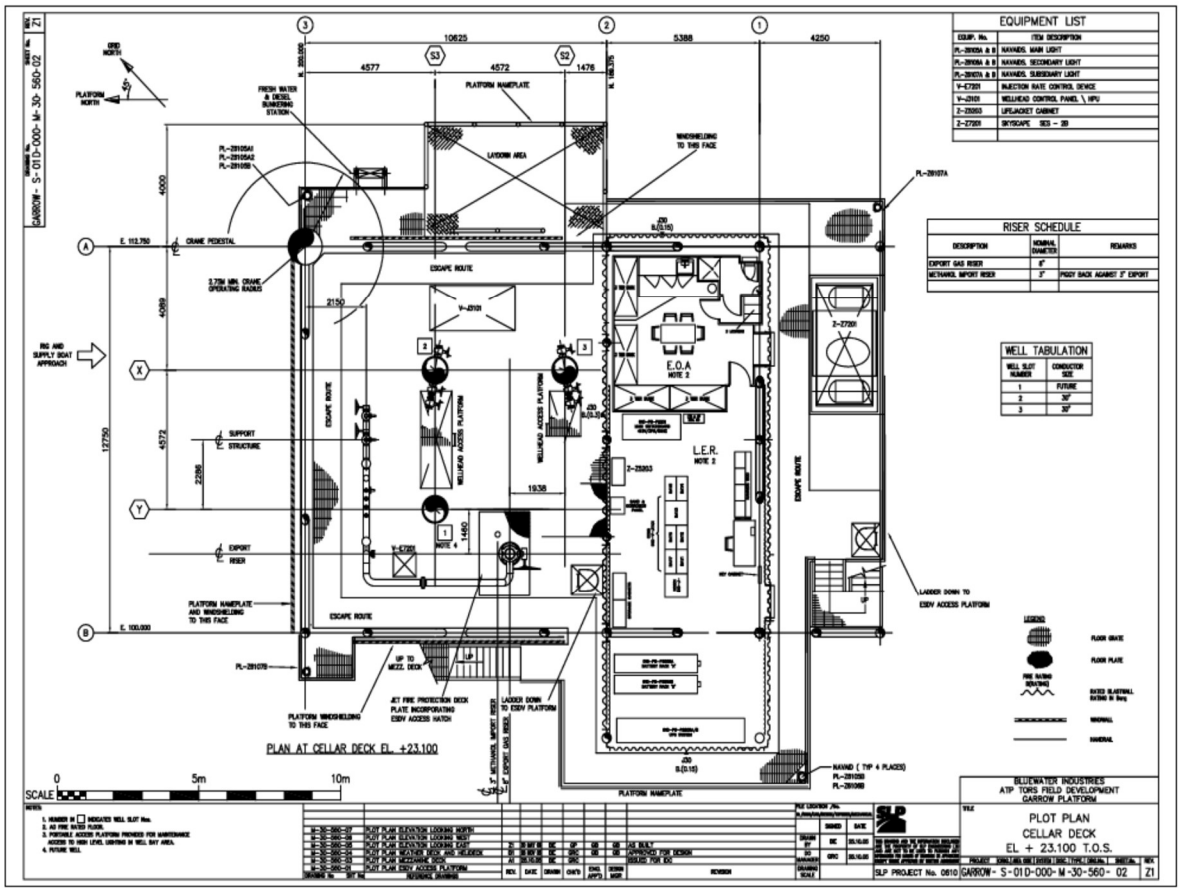
Topside Description:

The Garrow topside structure comprises three levels with an ESDV deck underneath, weighs 415 Te and the primary structure measures 12.75m x 16m x 8.3m high. The lower level is the Cellar Deck and has the two wellheads, wellhead control panel, Local Equipment Room, Temporary Refuge and where gas is exported to Kilmar. The Mezzanine Deck has the Christmas trees, generators, and freshwater tank. The Main Deck has a diesel tank integrated within the steel framework, crane, and cantilevered helideck.

Figures 3.1: Drawings of the Topside



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WELL TABULATION
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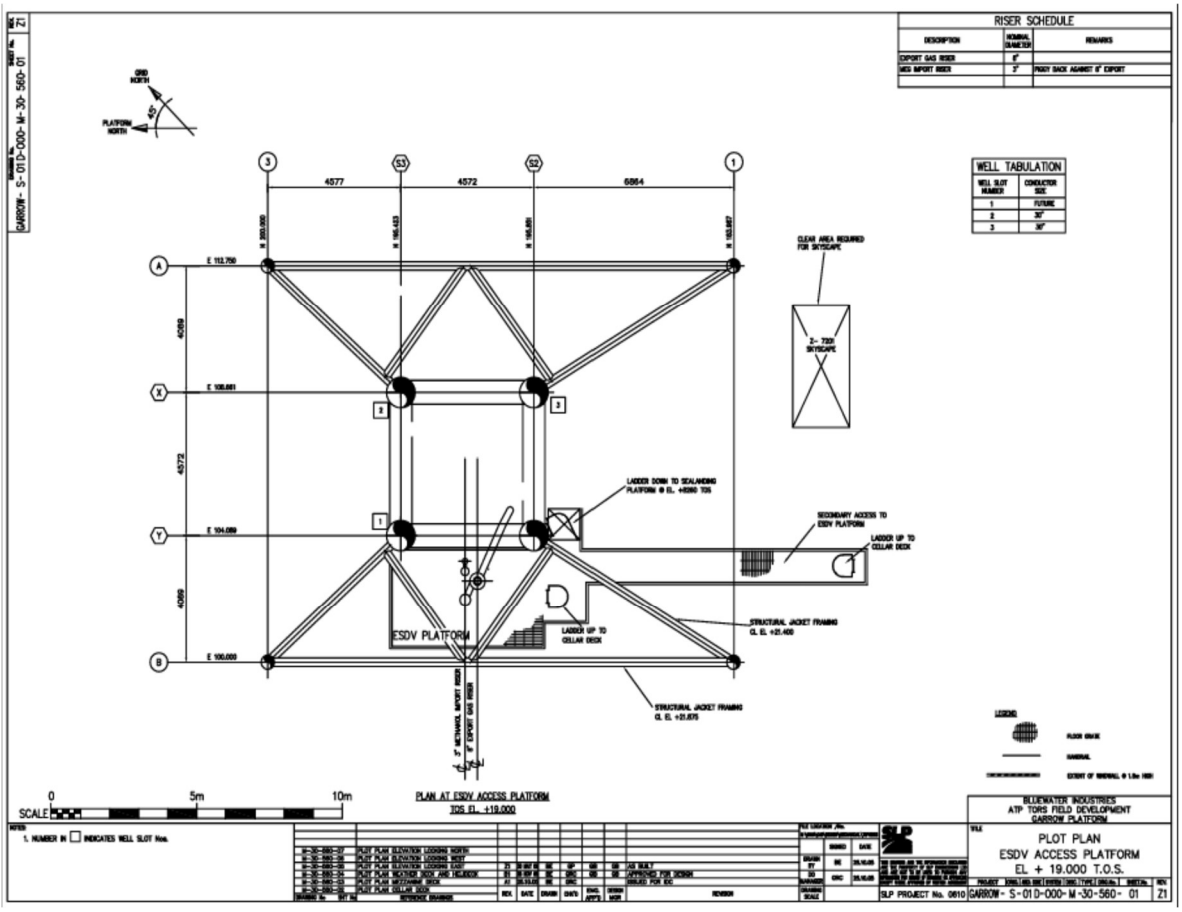
PLOT PLAN
CELLAR DECK
EL + 23.100 T.O.S.
BLUEWATER INDUSTRIES
ATP TORS FIELD DEVELOPMENT
GARROW PLATFORM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WELL TABULATION
ESDV PLATFORM
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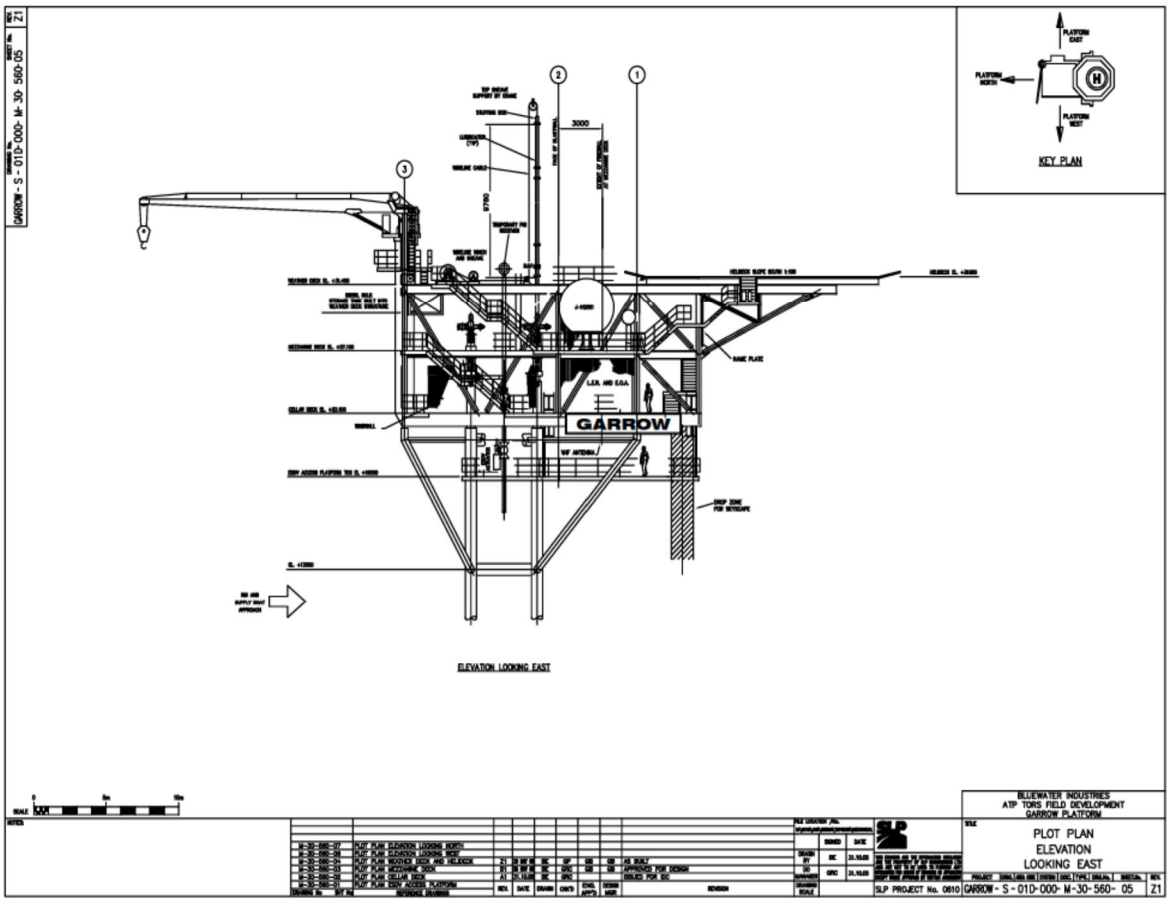
TOS EL. +19.000
PLOT PLAN
ESDV ACCESS PLATFORM
EL + 19.000 T.O.S.
BLUEWATER INDUSTRIES
ATP TORS FIELD DEVELOPMENT
GARROW PLATFORM



3.1.2 Preparation/Cleaning:

Table 3.1: Cleaning of the Topside for Removal		
Waste Type	**Composition of Waste**	**Disposal Route**
Onboard hydrocarbons	Process fluids, fuels, and lubricants	Flushed clean and either injected into platform wells or drained to tote tanks for transport and appropriate disposal onshore.
Other hazardous materials	NORM, LSA Scale, any radioactive material, instruments containing heavy metals, batteries	Some of these materials may be present and if identified will be transported onshore for re-use/disposal by appropriate methods. NORM will be disposed of in accordance with the appropriate permits. In the event that a Transfrontier Shipment of Waste (TFSW) permit is required, WPRL will liaise with the relevant Waste Authority and ensure all relevant permits/consents are in place.
Original paint coating		Garrow has no lead-based paint or Chromium (VI) paint. Appropriate safety measures will be taken dealing with all coatings.

3.1.3 Removal Methods:

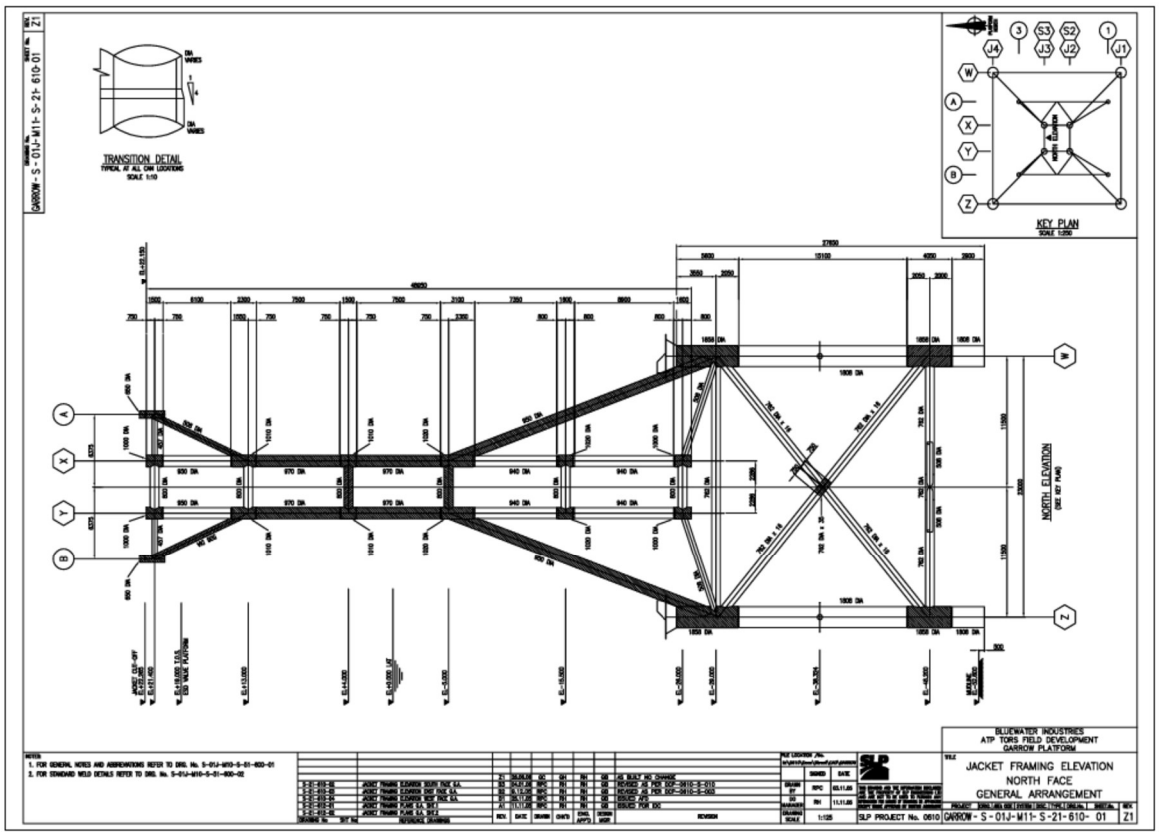
Table 3.2: Topside Removal Methods	
1) Semi-Submersible Crane Vessel ☑ 2) Monohull Crane Vessel ☑ 3) Shear Leg Vessel ☑ 4) Jack up Work barge ☑ 5) Piece small or large ☑ 6) Complete with jacket ☑	
Method	**Description**
Single lift removal along with jacket using SSCV/MCV/SLV	Removal of topside and jacket as a complete unit followed by recovery to shore for re-use, recycling, and disposal as appropriate.
Single lift removal using SSCV/MCV/SLV	Removal of topside as a single unit followed by recovery to shore for re-use, recycling, disposal as appropriate.
Piece-small or piece large removal using JUWB	Removal of topside in a series of smaller sub-units making use of the JUWB used for the well decommissioning activities, followed by recovery to shore for a programme of re-use, recycling or disposal as appropriate.
Proposed removal method and disposal route	Removal of topside followed by recovery to shore for re-use, recycling, and final disposal to landfill as appropriate. A final decision on the decommissioning method will be made following a commercial tendering process and OPRED notified. It is likely the topside removal will be a reverse of the installation, a single lift of the topside. The preferred options will be to prepare Garrow topside for lift, then a) collaborate with other decommissioning or installation projects to share costs, and / or b) to engage in dialogue with lift vessel owners and closely monitor for opportunities where a lift vessel has unplanned availability in the vicinity and can at short notice remove the Garrow topside. These solutions could involve any of the lift vessel types.

3.2 Jacket

3.2.1 Jacket Decommissioning Overview

The jacket weighs approximately 1,030Te which excludes the weight of the four piles, marine growth and lifting appurtenances. The jacket has an 8" gas export riser and a 3" MEG import riser. It is likely the jacket removal will be a reverse of its installation, a single lift. With the topside removed the piles will be internally cut 3.0m or greater below the seabed, slings attached, the jacket lifted and returned to shore for recycling. If any practical difficulties are encountered WPRL will consult OPRED.

Figure 3.2: Drawing of the Jacket Elevation



3.2.2 Jacket Removal Methods

Table 3.3: Jacket Removal Methods	
1) Semi-Submersible Crane Vessel ☑ 2) Monohull Crane Vessel ☑ 3) Shear Leg Vessel ☑ 4) Jack up Work barge ☑ 5) Piece small or large ☑ 6) Complete with jacket ☑	
Method	**Description**
Single lift removal along with topside using SSCV/MCV/SLV	Removal of topside and jacket as a complete unit followed by recovery to shore for re-use, recycling, and disposal as appropriate.
Single lift removal using SSCV/MCV/SLV	Removal of jacket as a single unit followed by recovery to shore for re-use, recycling, disposal as appropriate.
Piece-small or piece large removal using JUWB	Removal of jacket in a series of smaller sub-units, followed by recovery to shore for re-use, recycling or disposal as appropriate.
Proposed removal method and disposal route	Removal of the jacket, piles cut 3m below the natural seabed level, followed by recovery to shore for re-use, recycling, and final disposal to landfill as appropriate. A final decision on the decommissioning method will be made following a commercial tendering process and OPRED notified. It is likely the jacket removal will be a reverse of the installation, a single lift of the jacket. The preferred options will be to prepare Garrow jacket for lift, then a) collaborate with other decommissioning or installation projects to share costs, and /or b) to engage in dialogue with lift vessel owners and closely monitor for opportunities where a lift vessel has unplanned availability in the vicinity and can at short notice remove the Garrow jacket. These solutions could involve any of the lift vessel types.

3.3 Pipelines

Decommissioning Options:

* **Key to Options:**

1)	Remove - reverse reeling	2)	Remove - Reverse S lay	3)	Trench and bury
4)	Remedial removal	5)	Remedial trenching	6)	Partial Removal
7)	Leave in place	8)	Cut and lift	9)	Removal of tie-in spools

Table 3.4: Pipelines Decommissioning Options			
Pipeline	**Condition of line/group (Surface laid/trenched/ buried/spanning)**	**Whole or part of pipeline/ group**	**Decommissioning options considered**
PL2160, PL2161	Trenched, buried	Whole of pipelines	1& 2 (ref Option 3 of the CA Full removal of pipelines by reverse reeling/S Lay and Cut and Lift methods), 6, 8, & 9 (Ref Option 2 of the CA Partial removal of pipeline) and 7 (Ref Option 1 of the CA Leave Full Pipeline in situ)

Note: The options key is taken from the Decommissioning Programme streamlined template and is not the same option numbers used in the supporting Garrow Comparative Assessment (CA) document. The option numbering and descriptions used in the CA are described in section 5 of that document.

Comparative Assessment Method:

The options were assessed using the DESNZ Decommissioning Guidance Notes and project specific guidelines developed for a detailed assessment workshop.

A two-stage process with an early option screening assessment to narrow options to a manageable number followed by a detailed comparative assessment of selected options was adopted.

Stage 1: Option screening

A list of potential decommissioning options was developed for each pipeline which included an option for full recovery of all infrastructure, a leave all infrastructure in situ option and several partial removal options of specific elements. In a desktop exercise each of these options were then evaluated against safety, environmental, technical, societal, and economic categories, and considerations. They were then identified within each category as either an acceptable solution, a solution that may be acceptable with appropriate actions or control measures or an unacceptable option. Each option was then reviewed across all categories to establish whether the option should be selected for a more detailed comparative assessment. The outcome of this desktop exercise was then peer reviewed by an independent subsea expert and was shared with OPRED to ensure agreement that all potentially viable options were considered as part of the stage 2 detailed assessment.

Stage 2: Detailed assessment

Following development and approval of a Terms of Reference document a virtual workshop with available stakeholders and Waldorf decommissioning project team members was held. The workshop was conducted in the WPRL Guildford office and via MS Teams as a result of the COVID-19 pandemic travel restrictions and new working practises. This, along with pre workshop reading material and post workshop sharing of the output result worksheets ensured all relevant parties' input to the assessment was captured.

The workshop team rated the impact of the selected options with a further review against safety, environmental, technical, societal, and economic categories. Subcategories were reviewed and allocated a red, green, or amber rating code for each option in line with a pre-prepared guide table. Once the impacts for all subcategories were allocated the workshop attendees assigned an overall rating for each Category. A high, mid, or low certainty was also allocated to the degree of definition of the methods to be used, status of the infrastructure, equipment required, public opinion perception and any hazards.

A final colour rating to each option/sub option in line with the below table was then allocated.

Final rating options

Preferred solution	
Broadly acceptable	
Tolerable not preferred	
In tolerable, not acceptable	

Outcome of Comparative Assessment:

Full details of the ratings can be reviewed in the referenced APR_TORS_PMGT_013 Garrow Pipelines Decommissioning Options Comparative Assessment document. The below is a summary of the recommendations.

As a result of the assessment, it is recommended that for both the PL2160 pipeline and the PL2161 pipeline that a partial removal option is adopted where the majority of the pipelines are left in situ. At the platform ends the mattresses covering the pipelines shall be removed up until the point where the pipelines are rock dumped. The protection mattresses covering the tie-in spools shall also be recovered.

Table 3.5: Outcome of Comparative Assessment

Pipeline or Group (as per PWA)	Recommended Option	Justification
PL2160, PL2161	Option 2b in the CA reference options (Comparable to Option 9, 'remove only mat covered pipeline and spools sections' in section 3.3 'Decommissioning Options' considered)	Majority of the pipelines already trenched and buried to >0.6m or rock dumped, stable seabed, no snagging hazards or likely exposures of pipelines over time predicted.

3.4 Pipeline Stabilisation Features

Table 3.6: Pipeline Stabilisation Features

Stabilisation feature(s)	Number	Option	Disposal Route (if applicable)
Concrete mattresses (Garrow)	12	Full recovery of all exposed and not buried to 0.6m below the seabed. Those covered with rock dump are to be left in situ. It is intended that 11 exposed or partially exposed mattresses will be recovered to shore. It is also intended to remove the pipelines underneath each recovered mattress. A single Mattress may remain to prevent a snagging hazard if the cut end is exposed and not easily covered by the existing rock dump. The mattress will be moved, the pipelines cut, and then the mattress replaced over the cut end. Any remaining mat will be flush with seabed and overtrawlable. If the mattress is not used it will be recovered to shore. In the event of practical difficulties during the removal execution, OPRED will be consulted, and an	Return to shore for reuse / recycling / disposal

		alternative method of decommissioning will be examined through a comparative assessment.	
Concrete mattresses (Kilmar)	12	Full recovery of all exposed and not buried to 0.6m below the seabed. Those covered with rock dump are to be left in situ. It is intended that 11 exposed or partially exposed mattresses will be recovered to shore. It is also intended to remove the pipelines underneath each recovered mattress. A single Mattress may remain to prevent a snagging hazard if the cut end is exposed and not easily covered by the existing rock dump The mattress will be moved, the pipelines cut, and then the mattress replaced over the cut end. Any remaining mat will be flush with seabed and overtrawlable. If the mattress is not used it will be recovered to shore. In the event of practical difficulties during the removal execution, OPRED will be consulted, and an alternative method of decommissioning will be examined through a comparative assessment.	Return to shore for reuse / recycling / disposal
Grout bags	≈150 around the concrete mattresses	Leave in situ if buried 0.6m below the seabed. Full recovery if not buried or in the vicinity whilst mattresses are being recovered.	Return to shore for reuse / recycling / disposal
Rock Dump (Garrow and pipeline)	1 location, ≈750 tonnes	Leave in situ.	N/A
Rock Dump (Kilmar)	1 location, ≈750 tonnes	Leave in situ.	N/A

3.5 Wells

Table 3.7: Well Plug and Abandonment

The wells which remain to be abandoned, as listed in Section 2.3 (Table 2.4) will be plugged and abandoned in accordance with:

- OEUK Well Decommissioning Guidelines – Issue 7 – November 2022
- OEUK Guidelines on Qualification of Materials for the Abandonment of Wells – Issue 2 - 2015
- Design and Construction Regulations (DCR) 2015

A Well Intervention Master Application Template (WIA MAT) and supporting Subsidiary Application Template (SATs) will be submitted via the DESNZ UK Energy Portal to gain consent to carry out the works.

An application to decommission the wells will be made through WONS.

3.6 Waste Streams

Table 3.8 Waste Stream Management Methods	
Waste Streams	**Removal and Disposal method**
Bulk liquids	Hydrocarbons will be removed from the topside and shipped to shore in accordance with maritime transportation guidelines. Further cleaning will take place onshore prior to re-use or recycling. Contaminated seawater will be disposed of down a Garrow well or cleaned offshore and discharged to sea under the relevant permits. If disposal is not practicable offshore, then contaminated seawater will be removed from the topside and shipped to shore in accordance with maritime transportation guidelines. Further cleaning will take place onshore prior to re-use or recycling.
Marine growth	Marine growth will be removed by high pressure cleaning offshore, only where necessary and practicable, with the majority of marine growth removed onshore. It is estimated there will be 100 Te of marine growth.
NORM/LSA Scale	Tests for NORM/LSA scale will be undertaken offshore by the Radiation Protection Supervisor and any encountered will be dealt with and disposed of in accordance with guidelines and under appropriate permit.
Other hazardous wastes	Will be recovered to shore and disposed of in accordance with guidelines and under appropriate permit.
Onshore Dismantling sites	Appropriate licenced sites will be selected. Facility chosen by removal contractor must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options.

Table 3.9: Inventory Disposition			
	Total Inventory Tonnage	**Planned tonnage to shore**	**Planned tonnage left in situ**
Installations			
Topside	415	415	0
Jacket	1,030	1,030	0
Piles	520	328	192 (37%). Piles >3m below the mudline will remain.
Pipelines including stabilisation features			
Pipelines*	1,841	0	1,841 (100%)
Tie-in spools Garrow (includes anodes)	4.64	4.64	0
Tie-in spools Kilmar (includes anodes)	5.84	5.84	0
Mattresses Garrow	74.4	68.2	6.2 (8.4%). Potentially 1 mattress to cover the exposed pipeline end following severance.
Mattresses Kilmar	74.4	68.2	6.2 (8.4%). Potentially 1 mattress to cover the exposed pipeline end following severance.
Grout bags	3.75	1.5	2.25 (40%).

All recovered material will be transported onshore for re-use, recycling, or disposal.
* Pipelines weight differs from the pipeline pie chart weight (2,004 Te) as it excludes tie-in spools, anodes, mattresses, grout bags.

4. ENVIRONMENTAL APPRAISAL OVERVIEW

4.1 Environmental Sensitivities (Summary)

The environmental sensitivities in the area in which the decommissioning activities will take place are summarised in Table 4.1. Further details are available in the Environmental Appraisal report.

Table 4.1: Environmental Sensitivities

Environmental Receptor	Main Features
Conservation interests	The Garrow infrastructure is located within the boundary of the SNS SAC, designated for the protection of harbour porpoises. The next closest MPA is the Dogger Bank SAC, designated for the protection of the Annex I sandbanks which are slightly covered by seawater all the time, is located approximately 20km to the north-east of the Kilmar platform at its closest point. The 2022 pre-decommissioning survey at Garrow identified 'Subtidal sands and gravel' as a potential sensitive habitat in the survey area. No other Annex I habitats or Annex II species, OSPAR threatened and/or declining species and habitats or UK Biodiversity Action Plan priority habitats and species were observed within the survey area.
Seabed	Seabed sediments in the vicinity of the Garrow platform are comprised of fine to medium sandy sediments. Along the pipeline route the seabed is also predominately sandy with loose sand in the upper metre, lying on dense silty sand. Analysis of the sediment samples taken during the 2022 survey found that all stations conformed to the Folk classification of 'Sand'. The total hydrocarbon content (THC) across the survey area was low. No trend was observed between THC and distance from the Garrow platform, suggesting that the THC values present were not influenced by drilling activity. The mean bioavailable metals concentrations in the sediments were comparable to, or lower than the SNS mean background concentrations. The sediment type identified during the 2022 pre-decommissioning survey has been classified as the EUNIS biotope complex 'Faunal communities in Atlantic offshore circalittoral sand' (MD521). Benthic epifauna was generally sparsely distributed and consisted of starfish *Asterias rubens*, *Astropecten irregularis* and *Luidia sarsii* and hermit crabs (Paguridae). Analysis of sediment macrofauna from the 2022 survey found that the macrofaunal community was relatively homogenous across the survey area. The most dominant taxa were annelids, followed by crustacea and molluscs. The most abundant taxon was the annelid *Spiophanes bombyx* agg. The taxa encountered in the current survey were considered representative of a background SNS community.
Fish	Species likely to spawn within the vicinity of the Garrow infrastructure include cod, herring, lemon sole, mackerel, *Nephrops*, plaice (high intensity spawning ground), sandeels (high intensity spawning ground), sole, sprat and whiting. The location is also likely to be a nursery ground for anglerfish, blue whiting, cod, European hake, herring, horse mackerel, lemon sole, ling, mackerel, sandeels, sprat, spurdog and whiting. Juvenile fish more likely to be found in the area include herring, horse mackerel, mackerel and whiting.

Fisheries	The Garrow infrastructure is located within International Council for the Exploration of the Sea (ICES) Statistical Rectangles 37F0 and 37F1. Fishing effort is relatively high in ICES Rectangle 37F0, with the mean annual fishing effort between 2016 and 2020 at 1,007 days. Fishing effort is highest in March, May and September. The majority of fishing effort is from dredgers followed by traps. Landings data (by weight) indicates that catches are largely composed of shellfish (70%) followed by pelagic species (25%). The most commonly caught species are crabs, herring and scallops. Fishing effort is low in ICES Rectangle 37F1 with the mean annual fishing effort between years 2016 to 2020 at 167 days. Fishing effort is highest in July and August. Landings data demonstrate that catches (by weight) are largely composed of shellfish (63%), followed by demersal species (37%) and the most frequently caught species are crabs, *Nephrops* and plaice.
Marine Mammals	Harbour porpoise and white-beaked dolphin are considered to be regularly occurring in the SNS and both species have been observed in the vicinity of the Garrow infrastructure. Minke whale is also a frequent seasonal visitor. The Garrow platform is located within the northern two thirds of the SNS SAC which is recognised as important for harbour porpoises during the summer season (April to September). The distribution of grey seal and harbour seal in the vicinity of the Garrow infrastructure is moderate (< 10 individual per 25 km^2) and low (< 1 individual per 25 km^2) respectively.
Birds	The offshore waters of the SNS are visited by seabirds, mainly for feeding purposes in and around the shallow sandbanks. The most abundant species of seabird predicted to be present in the vicinity of the Garrow infrastructure are guillemot in the breeding season, fulmar and herring gull over winter, and guillemot during the post breeding dispersal period. Of note, in June 2021, WPRL recorded kittiwake present on the Garrow platform, although no breeding pairs or nests were observed, as well as great black-backed gull, herring gull, and lesser greater black-backed gull. Further visual surveys of the platform since then, undertaken in June, August and September 2022 and February and March 2023 have also not observed nests.
Onshore Communities	Onshore communities are potentially sensitive to disturbance from cleaning, dismantling and disposal activities. Appropriate licenced sites will be selected. Facility chosen by removal contractor must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options.
Other Users of the Sea	Shipping activity is moderate to high in the vicinity of the Garrow infrastructure, predominantly comprised of cargo ships and offshore support vessels. The closest windfarm to the Garrow platform is the Hornsea Project Four (Operator: Ørsted) which is in the pre-planning stage, located approximately 7 km to the southeast of the Garrow platform. The operational Hornsea Project Two wind farm turbine area (Operator: Ørsted Hornsea) is located 32 km to the southeast of the Garrow pipelines and the operational Hornsea Project One (Operator: Ørsted), is located approximately 44 from the Garrow pipelines at its nearest point. The consented Dogger Bank export cable is located 27 km to the north of the Garrow platform. The Garrow area overlaps with a Ministry of Defence Royal Airforce Practice and Exercise Area.
Atmosphere	Atmospheric emissions will be produced during the proposed Garrow decommissioning activities as a result of the fuel consumed by offshore vessels, diesel-powered equipment and generators. It is predicted that these emissions will only result in localised and short term impacts on air quality, with prevailing metocean conditions expected to lead to the rapid dispersion and dilution of the emissions. The contribution to UKCS and global atmospheric emissions will be negligible.

4.2 Potential Environmental Impacts and their Management

An initial screening of the potential impacts to environmental and societal receptors from the proposed Garrow decommissioning activities concluded that the only aspects considered to be potentially significant and therefore requiring further assessment were physical presence, seabed disturbance and underwater noise. However, following further assessment and upon implementation of the identified mitigation measures, the Environmental Appraisal report concluded that no significant residual effects are predicted to occur as a result of the proposed Garrow decommissioning activities, with the majority of impacts being localised and temporary in nature.

Environmental Impact Assessment Summary:

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
Topside Removal	The physical presence of the Garrow platform, particularly if it enters a Lighthouse Mode phase, has the potential to provide nesting habitat to breeding seabirds, which forage in the SNS. Black-legged kittiwake have been recorded on breeding ledges of the Garrow platform in June 2021, although no breeding pairs of kittiwake or nests were observed. However, the removal of the Garrow topside has the potential to result in significant impacts to seabirds nesting on the platform, if present in future years, through disturbance by operational movement and noise. Once the chicks start hatching in June they are particularly vulnerable to human disturbance that may spook them from the nest, resulting in them falling or being pushed to sea. The vessels required for the removal of the topside will be present on location within the existing 500 m safety exclusion zone surrounding the Garrow platform. This zone is clearly marked on navigation charts and has been in place for a number of years. If an anchored lift vessel (LV) is used to remove the topside, the anchor lines are likely to extend outside the exclusion zone, although this should not present a significant hazard to shipping or fishing vessels as they are unlikely to transit immediately adjacent to an existing exclusion zone. Residual effects on other sea users resulting from the physical presence of vessels on location at Garrow and transiting to / from site are therefore negligible. Underwater noise generated from vessel operations (e.g. use of propellers / dynamic positioning thrusters) has the potential to result in behavioural disturbance to marine mammals and fish. However, the area of disturbance will be localised and any impacts will be temporary in nature and not significant, particularly relative to the underwater noise generated by existing levels of vessel traffic in the wider SNS area.	Installation of nesting bird deterrents will be considered when the preparatory work is being undertaken to discourage birds from nesting on the platform, if it enters the Lighthouse Mode phase. WPRL will continue to check for the presence of nesting birds on scheduled routine visits to the Garrow platform, noting there is not a history of nesting birds on the platform. If the topside is to be removed during the breeding season, data will be reviewed to confirm the absence of nesting birds and, if considered necessary, the platform will be checked by a qualified ornithologist prior to removal. If nesting birds are observed, OPRED will be consulted to ascertain if it is possible for a Wild Birds Licence to be granted to allow the works to go ahead. If any other decommissioning activity (e.g. preparatory works) is to be undertaken on the topside during the breeding season, the platform will be checked for nesting birds prior to commencing work. OPRED will be informed of the results and, if necessary, a Wild Birds Licence applied for. In the event nesting birds are observed, WPRL currently propose to erect signage in the area advising offshore personnel of the nests and personnel will be briefed on instructions to minimise possible disturbance to the juveniles and attending adults. The nests will also be monitored on a daily basis to record bird presence and activity. Where required, Consent to Locate permits will be in place, existing collision risk management plans will be reviewed and notifications of the proposed decommissioning activities will be made to regular users of the area via Notices to Mariners, NAVTEX/NAVAREA warnings and Kingfisher bulletins. If the jacket is removed in a separate campaign to the topside, a solar navaid / foghorn will be installed to warn other sea users of its presence.

Jacket	The vessels required for the removal of the jacket will be present on location within the existing 500 m safety exclusion zone surrounding the Garrow platform. This zone is clearly marked on navigation charts and has been in place for a number of years. If an anchored LV is used to remove the jacket, the anchor lines are likely to extend outside the exclusion zone, although this should not present a significant hazard to shipping or fishing vessels as they are unlikely to transit immediately adjacent to an existing exclusion zone. Residual effects on other sea users resulting from the physical presence of vessels on location at Garrow and transiting to / from site are therefore negligible. In addition, once the Garrow platform has been removed, the 500 m safety exclusion zone surrounding the platform will be withdrawn. This will result in a positive impact as an area of circa 0.79 km^2 will be made available to other sea users. Physical disturbance of the seabed resulting from the removal of the jacket, temporarily placing materials and equipment on the seabed and anchoring of the LV is likely to cause displacement or mortality of benthic species, such as sessile organisms, that are unable to move out of the impacted area. However, species in highly dynamic, tidally-influenced areas such as those found in the shallow waters of the SNS, are generally tolerant of physical disturbance. Underwater noise generated from vessel operations (e.g. use of propellers / dynamic positioning thrusters) has the potential to result in behavioural disturbance to marine mammals and fish. However, the area of disturbance will be localised and any impacts will be temporary in nature and not significant, particularly relative to the underwater noise generated by existing levels of vessel traffic in the wider SNS area. Underwater noise emissions from cutting tools are unlikely to result in sufficient levels of noise to cause significant disturbance to marine fauna.	Where required, Consent to Locate permits will be in place, existing collision risk management plans will be reviewed and notifications of the proposed decommissioning activities will be made to regular users of the area via Notices to Mariners, NAVTEX/NAVAREA warnings and Kingfisher bulletins. Jacket legs will be cut internally, to avoid seabed disturbance from external excavation. Operations will be planned to reduce vessel movements and minimise the overall duration of the project. Where vessels are required to hold position for extended durations, jack-up or moored vessel will be used in favour of DP vessels.
Decommissioning Pipelines & Stabilisation Features	The seabed will be physically disturbed by the cutting of pipeline ends and removal of surface laid pipeline sections / tie-in spools, including mattresses and gravel bags at the approaches to the Garrow and Kilmar platforms. Physical disturbance of the seabed can cause displacement or mortality of benthic species, such as sessile organisms, that are unable to move out of the impacted area. However, due to the transient nature of the operations, it is expected that recovery of the affected areas will be relatively rapid once the proposed activities have been completed. Of note, is that the fauna found in the vicinity of	Operations will be planned to reduce vessel movements and minimise the overall duration of the project. Internal cutting techniques will be utilised where possible, which do not produce any significant noise emissions. Where internal cuts are not possible, external cuts will be via mechanical methods as they produce significantly less noise than of abrasive methods. No new mattresses, gravel bags or rock dump will be placed on the seabed.

	Garrow are robust infauna that are adapted to frequent disturbances and natural fluctuations in sediment loading and resuspension. Retrieval of mattresses and gravel bags at the approaches to the Garrow and Kilmar platforms will result in hard / coarse substratum habitats being replaced by sediment habitats, more typical of this area of the SNS. As a result, there will be localised changes in benthic communities from epifaunal species that can colonise hard substrata to those that favour of soft sandy sediments. There will be a legacy impact from the stabilisation material which will be decommissioned in situ, including the redeployment of any material required to protect the cut ends of the pipelines, if required. However, the scale of the impact is negligible considering the very large extent of sandy seabed available in the SNS. There is a risk of fishing gear snagging on infrastructure that is being decommissioned in situ. To minimise this risk, WPRL is proposing to remove any exposed subsea infrastructure. The majority of the pipelines are currently buried to a depth well in excess of 0.6 m and no pipeline exposures have been seen in any of the operational surveys. The rock which has been deposited along the pipelines is very stable and there has been no migration due to seabed currents or fishing activity over the area. The pipelines will also be left in situ in a flooded condition, so no upward movement is expected. Underwater noise generated from vessel operations (e.g. use of propellers / dynamic positioning thrusters) has the potential to result in behavioural disturbance to marine mammals and fish. However, the area of disturbance will be localised and any impacts will be temporary in nature and not significant, particularly relative to the underwater noise generated by existing levels of vessel traffic in the wider SNS area. Underwater noise emissions from cutting tools are unlikely to result in sufficient levels of noise to cause significant disturbance to marine fauna.	Details of any infrastructure decommissioned in situ will be publicised through Notices to Mariners and marked on navigation and fisheries charts. A post-decommissioning monitoring programme covering the pipelines and associated stabilisation features remaining in situ will be agreed with OPRED, if necessary.

5. INTERESTED PARTY CONSULTATIONS

Consultations Summary:

Table 5.1: Summary of Stakeholder Comments		
Who	**Comment**	**Response**
Statutory Consultations		
National Federation of Fishermen's Organisations	NFFO's view on non-intrusive post decom surveys is that they prefer full overtrawl trials with bottom gear only (no nets involved so no risk of damage to nets). This is not in agreement with JNCC's view and ongoing discussions with JNCC/ OPRED are continuing. Some incidents of post decom snagging after non-intrusive surveys have been noted. The windfarm activity (in particular Hornsea) has pushed fishing activity further north into the ICES rectangle 37F0 (near Garrow) over the last few years so the same static gear is now used in a smaller area.	Final seabed clearance verification methodology to be agreed with OPRED. Garrow decom will provide greater area available to fishing industry. NFFO have been involved in the CA process.
Scottish Fishermen's Federation	SFF have been consulted and are content given the geographical location of Garrow to let NFFO consult with regards to any fishing interaction with the decommissioning activities.	N/A
Northern Irish Fish Producer's Organisation Limited	NiFPO have been consulted and are content given the geographical location of Garrow to let NFFO consult with regards to any fishing interaction with the decommissioning activities.	N/A
Global Marine Group	GMG have confirmed there are no cables within 50km of the decommissioning works.	
Informal Stakeholder Consultations		
Joint Nature Conservation Committee	Stated that they see the Garrow decommissioning project as a potential net benefit project in terms of benthic impacts. Would like to understand the frequency of pipeline surveys that will take place before and after decommissioning. Had concerns about the camera drops along the pipeline and if there were enough. JNCC suggested that photos may be better than grab samples and will be available sooner. Suggest consider going for more photos. JNCC would like to see more details of the rock berms along the pipeline and what the fishing industry's opinions of them are. Would like to see the survey data being used to avoid an overtrawl survey later on, whereas the fishing industry may argue for it. JNCC would like include an assessment of the Greater Wash SPA. Suggesting to include the Red Throated Diver bird in the ES and	WPRL confirmed that the Garrow route survey has been completed in 2022 and will have further route surveys on completion of the decommissioning. Updates from the 2022 survey have been included in the supporting CA document to this DP. Future survey requirements will be discussed and agreed with OPRED NFFO view is that rock berms can be left in place as higher %age of fishing activity is

	considerations for observing best practise in that respect e.g. directing marine traffic to use the defined shipping lanes as much as possible to avoid disruption. Specific subcategories for the Greater Wash SPA have been included within the CA Environmental impact category.	with static gear that is not impacted by rock berms. Final seabed clearance verification methodology to be agreed with OPRED. Red-throated diver are most at risk of disturbance if vessels were transiting to / from Hull, Great Yarmouth or Lowestoft. Therefore, to minimise disturbance, WPRL proposes to implement the following mitigation measures: • Restricting, to the extent possible, vessel movements within the Greater Wash SPA to existing navigation routes when transiting to / from the Garrow location; • Maintaining direct transit routes; • Avoiding over-revving of engines; • Briefing vessel crew on the purpose and implications of vessel management practices within the Greater Wash SPA. JNCC have been involved in the CA process.
Public	TBA	TBA

6. PROGRAMME MANAGEMENT

6.1 Project Management and Verification

An WPRL Project Management team will manage suitable Contractors for decommissioning activities and the removal of the installation. The team will ensure the decommissioning is executed safely, in accordance with legislation and WPRL Health and Safety principles. Where possible the work will be coordinated with other decommissioning operations in the SNS. The team will monitor and track the process of consents and the consultations required as part of this process. Any changes in detail to the offshore removal programme will be discussed and agreed with OPRED.

6.2 Monitoring of the Facilities in Lighthouse Mode

If it is chosen to put the Garrow facilities into Lighthouse Mode for a period, monitoring of the facilities Aids to Navigation will be monitored onshore via the Automatic Identification System (AIS). No maintenance of the facilities is planned whilst in Lighthouse Mode however the platform will be subject to visual surveys to ensure the integrity of the facilities is maintained until removal."

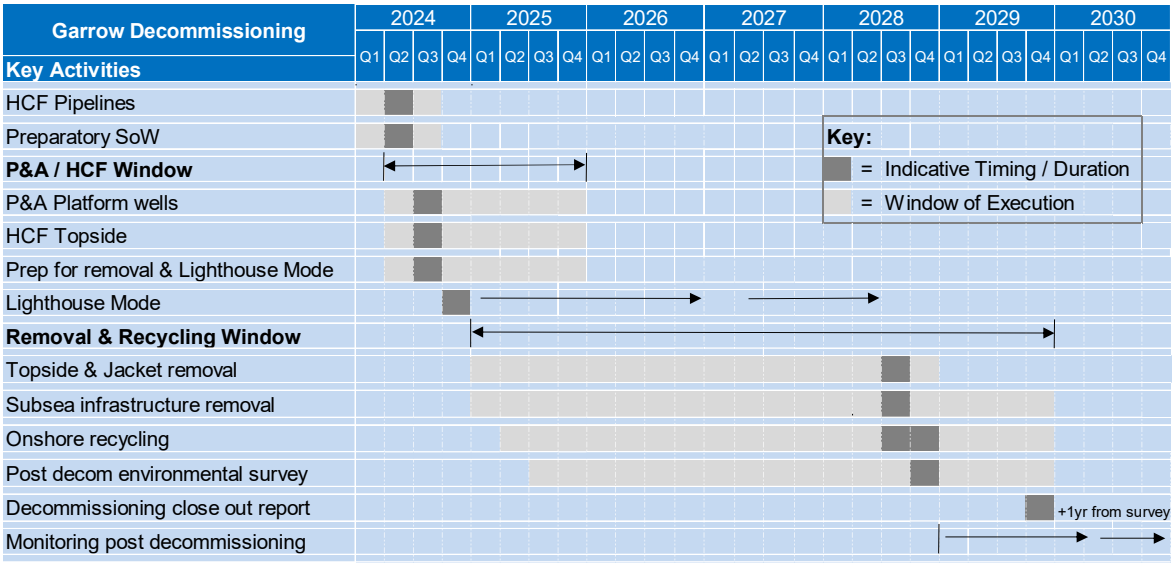
6.3 Post-Decommissioning Debris Clearance and Verification

A post decommissioning site survey will be carried out around the Garrow platform 500m radius and a (*minimum*) 100m corridor (*50m either side*) along each existing pipeline route where decommissioning activities have taken place to identify any oil and gas debris. Any seabed debris related to offshore oil and gas activities will be recovered for onshore disposal or recycling in line with existing disposal methods. Verification of seabed clearance will be provided to OPRED following decommissioning activities. This will be included in the Close Out Report and sent to the Seabed Data Centre (*Offshore Installations*) at the Hydrographic Office.

6.4 Schedule

The Project Plan is subject to approval of the decommissioning programmes and unavoidable constraints such as Contractor availability. OPRED will be informed of dates of activity in advance, when known.

Figure 6.1: Project Plan



Note: Indicative plan, the activity window is subject to tender award and synergies with other operations for cost savings.

6.4 Costs

Decommissioning costs are provided separately to OPRED and NSTA.

Table 6.1: Provisional Decommissioning Programmes costs	
Item	**Estimated Cost (£m)**
Project Management	Provided to OPRED & NSTA
Facility Running/Owner	Provided to OPRED & NSTA
Well Abandonment	Provided to OPRED & NSTA
Making Safe	Provided to OPRED & NSTA
Topside Preparation	Provided to OPRED & NSTA
Topside Removal	Provided to OPRED & NSTA
Substructure Removal	Provided to OPRED & NSTA
Subsea Infrastructure	Provided to OPRED & NSTA
Onshore Recycling and Disposal	Provided to OPRED & NSTA
Site Remediation	Provided to OPRED & NSTA
Monitoring	Provided to OPRED & NSTA
TOTAL	Provided to OPRED & NSTA

6.5 Close Out

In accordance with the DESNZ guidelines, a close out report will be submitted to OPRED within 1 year of the completion of the offshore decommissioning scope including debris clearance, verification of seabed clearance and the results of the post-decommissioning environmental survey. The report will detail the outcomes of surveys as well as explain any major variances from the programme.

6.6 Post-Decommissioning Monitoring and Evaluation

A post-decommissioning environmental seabed survey will be carried out around the platform in similar locations to the pre decommissioning Environmental Baseline Survey. The survey report will be reviewed and compared with the pre-decommissioning survey. A MBES and SSS survey of the full pipeline route covering a corridor 50m either side of the pipeline route will be completed which will also cover a 500m radius of the platform site. A risk-based post monitoring survey regime will be proposed by WPRL which will be agreed with OPRED.

7. SUPPORTING DOCUMENTS

Table 7.1: Supporting Documents	
Document Number	**Title**
APR_TORS_PMGT_013	Garrow Pipelines Decommissioning Options Comparative Assessment
APR_TORS_PMGT_014	Garrow Environmental Appraisal Report

8. S29 HOLDER LETTERS OF SUPPORT

Hold, to be included

9. APPENDIX

9.1 COPY OF PUBLIC NOTICE

Hold, to be included

9.2 DEPTH OF BURIAL GRAPHS

Figures A1 – A4 below provide snapshots along the pipeline routes of burial data and comparisons with interim seabed surveys between 2005 and 2016. More detailed discussion narrative is also available within the supporting Comparative Assessment document.

Fig A.1 2005 As Backfilled survey chart extract (KP 5.2 – KP 6.55)

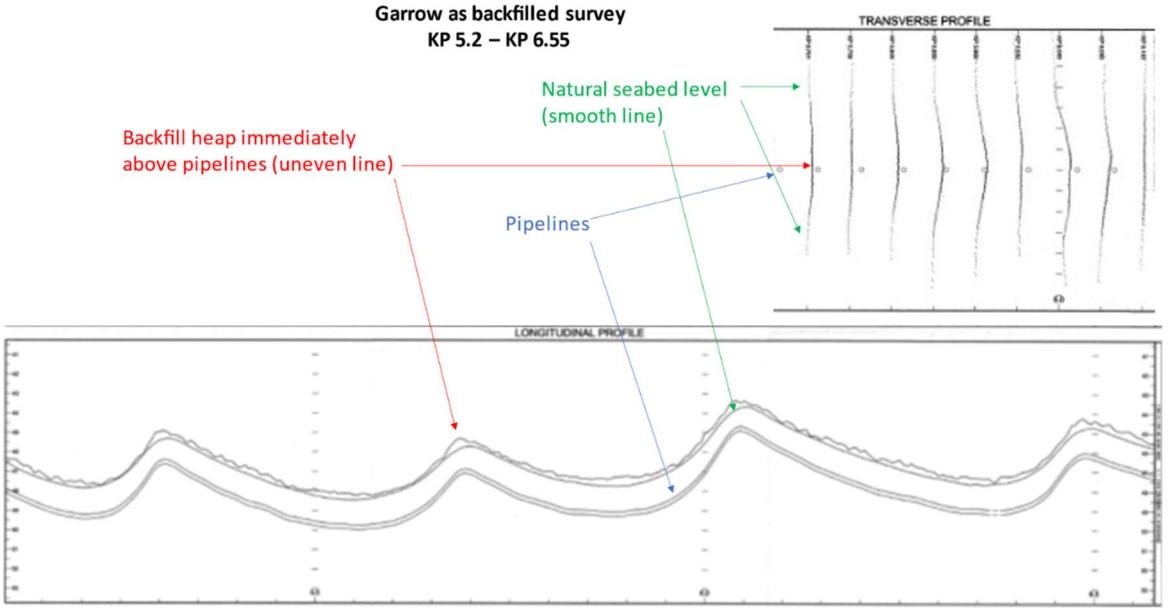


Fig A.2 As Backfilled chart and interim operational survey profiles (KP5.2 – KP 6.55)

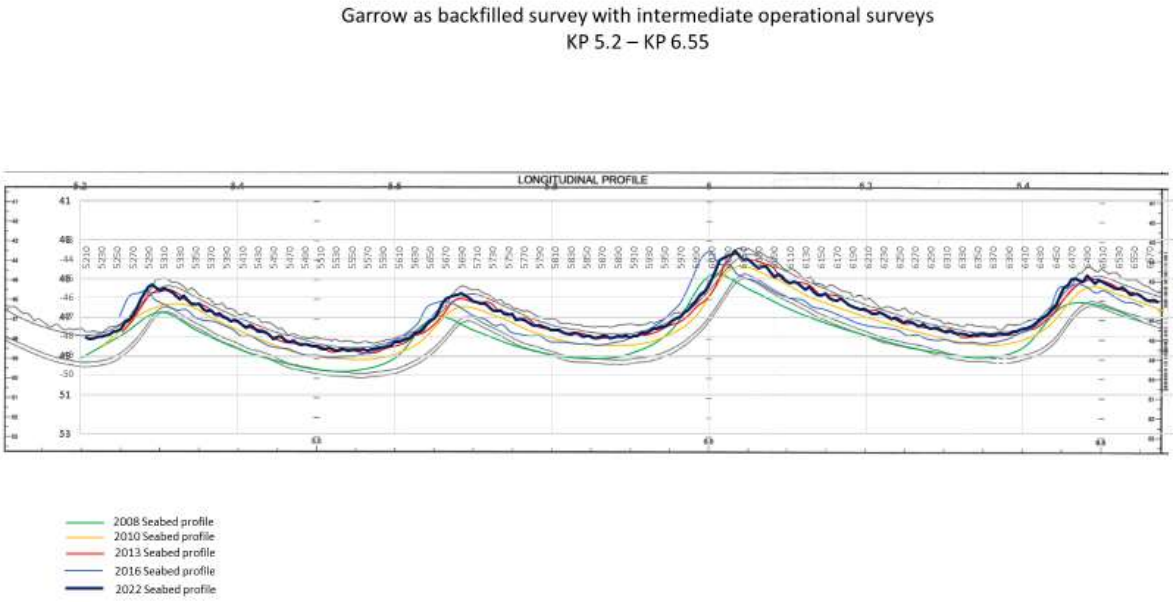


Fig A.3 As Backfilled chart and interim operational survey profiles (KP17.55 – KP 19.05)

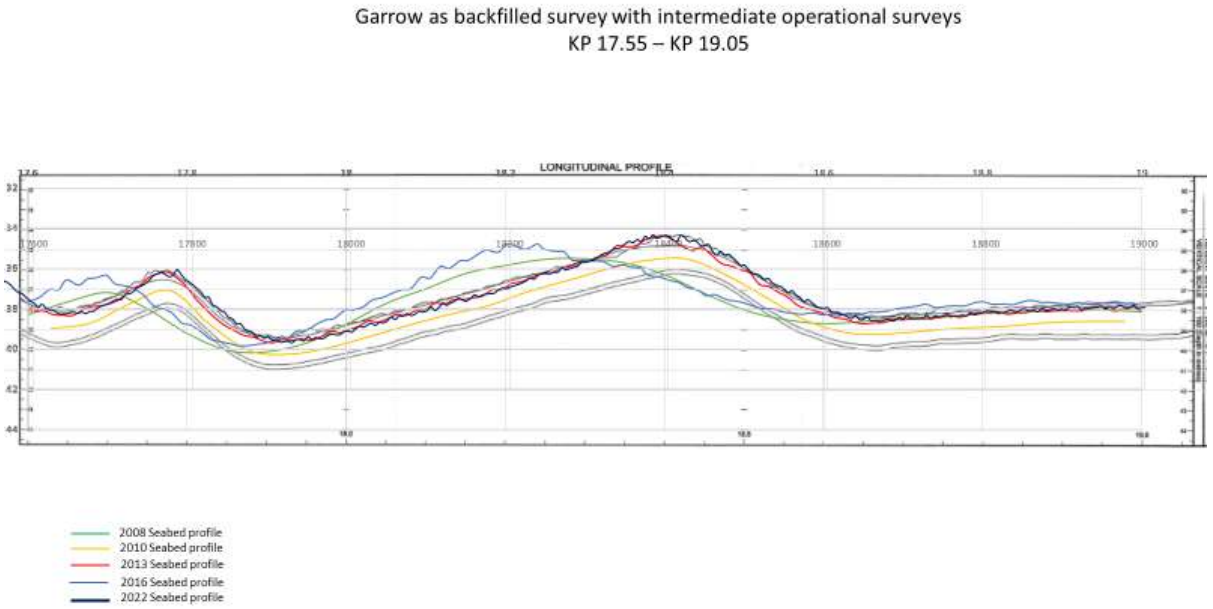


Fig A.4 As Backfilled chart and interim operational survey profiles (KP10.7 – KP 12.1)